V. S. L. PATE

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ENTOMOLOGICAL NEWS

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The Anatomy and Histology of the Digestive System of a Supposedly Non-Feeding Adult Moth, Callosamia promethea Dru. (Lepidoptera: Saturniidae).[1]

By ROBERT W. PYLE.

(Continued from page 185.)

HISTOLOGY IN THE SYSTEM.

The inner surface of the *buccal cavity* is lined with chitin; next to this there is a layer of flat epithelial cells. Outside the epithelial cells is a layer of loose connective tissue and several layers of muscle cells. At certain points, namely the most ventral and dorsal parts, the muscles which extend from the walls of the cavity to the head capsule are attached directly to the chitin. The chitin on the floor of the cavity is thick and stains like that of the exoskeleton, whereas that of the sides and roof of the cavity stains differently and is much more delicate in structure.

The ducts from the *salivary glands* to the exterior are lined with chitin, around which is a thin layer of flat epithelial cells, but the glands proper are not chitin-lined. They are composed of large epithelial cells that are similar in shape to those of the Malpighian tubules. They possess large, branching nuclei.

The *oesophagus* is composed of three layers. The innermost one is a thin layer of chitin. This is surrounded by a layer of flat epithelial cells, a single layer of circular muscles, and a few longitudinal muscles.

The *sucking stomach* is lined with chitin which is surrounded by a layer of extraordinarily thin epithelial cells. These cells are so thin that it is difficult to determine their presence. Supporting these cells is a layer of widely separated muscle fibers. (fig. 2). This condition may have been caused by the inflation of the sucking stomach with air as suggested above.

The *oesophageal valve* is composed of two layers of cells. The inner is that of the oesophagus, and the outer that of the mid-gut. The chitinous lining persists as far as the hind end of the oesophagus where it abruptly ceases. (fig. 8).

The *mid-gut* is composed of a layer of columnar epithelial cells, which have granular inclusions in the cytoplasm. This layer is surrounded by longitudinal and transverse muscles in varying amounts (depending upon the particular place examined) (fig. 5).

The *Malpighian tubules* at their junction with the alimentary tract are composed of columnar cells, but in the tubes proper the cells are cuboidal. Their inner surface has a brush border; no evidence of chitin was found. They do not, however, seem to possess distinct cilia such as has been figured by Bordas (1920) for the specimens which he examined.

The *intestine* is composed of an inner layer of cuboidal epithelial cells, a layer of circular muscles, and a few longitudinal muscles. It is lined with a layer of chitin (fig. 6).

The *rectum* is composed of a layer of cuboidal cells, transverse and longitudinal muscles. There are many gland-like structures present. These are disc-or cup-shaped, varying from fifty to one hundred micra in diameter. That part of the "gland" which is next to the rectal wall is composed of small epithelial cells which form the base and sides of the cup. The surface directed toward the lumen of the rectum is composed of a thin layer of chitin (as is the rest of the rectum) under which there is a layer of large cells (fig. 7). some of these contains inclusions which look like secretory or absorbed material. In the center of the "gland" is a lumen.

COMPARISON WITH FEEDING FORMS OF LEPIDOPTERA.

There is a vast difference between the external mouth parts of *Callosamia promethea* and the feeding Lepidoptera studied (*Epargyeus tityrus, Protoparce carolina, Haemorrhagia thysbe*). There is less development of the rudimentary mandibles in *C. promethea* than in *P. carolina.* In fact *C. promethea* lacks so much in the form of external mouth parts that there is no comparison between its mouth parts and those of the feeding forms.

The buccal cavity of all four species is superficially similar in structure. *P. carolina* and *H. thysbe* possess powerful muscles which are used in imbibing food. Schmitt (1938) describes the Sphingidae as having the most highly developed type of musculature in the buccal cavity and states for the Saturniid, *Samia cecropia*—"There is a single pair of pharyngeal dilators, still recognizable by means of the frontal ganglion. Laterally, there are two pairs of muscles which might be functional. No salivarium muscles could be found." The same statements are true for *C. promethea.*

The greatest difference between the salivary glands of the different species seem to be in their length as is shown by the number of folds. *P. carolina* has by far the longest; those of *H. thysbe* are slightly longer, and those of *E. tityrus* much shorter, than those of *C. promethea.* Otherwise the salivary glands of the four species examined seem to be quite similar. No difference in the number of salivary glands was observed.

In cross section the oesophagus of the feeding forms shows several folds. This apparently is to permit the dilation of the oesophagus during feeding. These folds are lacking in *C. promethea.* The musculature is somewhat more deveolped in the oesophagus of the feeding forms; otherwise they are all similar.

The sucking stomach, or food reservoir, Malpighian tubules, and intestine do not present any striking differences between *C. promethea* and the other three species compared.

The oeseophageal valve presents one of the outstanding differences. In *C. promethea* the oesophagus enters the mid-gut dorsad and curves down opening ventrally in the interior of the mid-gut. Structurally it shows no adaptation for functional use, and the cells are rather large (figs. 3, 4, 8). In *P. carolina,* however, there is a different condition. The heavily-muscled oesophagus has a definite opening; the oesophageal valve is a much more definite structure. The cellular structure of the tissue is different. The epithelial cells of the oesophagus at the oesophageal valve are almost negligible; in *C. promethea* they are prominent.

The mid-guts of three feeding forms examined are somewhat similar to that of *C. promethea.* In *C. promethea* the cells are large and loosely joined together, whereas in the feeding forms they are proportionally thinner and very compact. In *P. carolina* there are four to five times as many cells per one hundred micra as in *C. promethea.*

The rectal "glands" differ most in size in the species compared. In the case of *P. carolina* the chitinous layer seems thicker, but the epithelial layer seems thinner. Comparisons with the other forms showed that the differences were in amount rather than in the types of cells present.

Summary.

1. The digestive system of *Callosamia promethea,* a non-feeding adult, has been compared with those of three feeding adults—*Epargyeus tityrus, Protoparce carolina, Haemorrhagia thysbe*—and found to be made up of parts possessed by Lepidoptera in general.

2. The external mouth parts are very much atrophied and wanting.

3. The musculature of the buccal cavity is weak.

4. The oesophageal valve shows the most divergence from the feeding forms studied, being composed of large, loosely joined cells; the opening into the mid-gut is small.

5. There is little difference between the four forms studied as to the Malpighian tubules, salivary glands and intestine.

6. Many rectal "glands" are present.

References.

Bordas, L. 1920. Etude anatomique et Histologique de l'Appareil Digestif des Lepidopteres Adultes. Ann. des Sci. Nat 1920 III ser. 10: 175-250.

Borri, 1925. Le papille rettali degli insetti. Atti della Soc. Toscana di Sci. Nat. 36: 226-280.

Burgess, E. 1880. Contributions to the Anatomy of the Milkweed Butterfly, Danais archippus, Fabr. Ann. Mem. Bost. Soc. Nat. 1880: 1-16.

Imms, A. D. 1933. A Textbook of Entomology. 3rd Ed.

Ito, H. 1915. On the metamorphosis of the silk glands of Bombyx mori. Bull. Imper. Tokyo Sericultural College, Japan, 1 (2): 19-43, 7 pls. Nov., 1915.

Id., 1920 *a.* On the metamorphosis of the Malpighian tubes

of Bombyx mori L. Op. cit. 1 (5): 105-118, 2 pls. March, 1920.

Id., 1920 b. On the metamorphosis of the alimentary canal of Bombyx mori L. Op. cit. 2 (1): 1-46, 8 pls. Dec., 1920.

Id., 1921. On the metamorphosis of the Malpighian tubes of Bombyx mori L. Journ. Morph. 35 (1): 195-211, 2 pls. March, 1921. Text identical with 1920a, figures different.

Minot, C. S. & Burgess, E., 1884. Report on the Anatomy of Aletia xylina. 4th Rept. U. S. Entom. Comm. Wash. D. C.

Schmitt, J. B., 1938. The Feeding Mechanism of Adult Lepidoptera. Smithsonian Misc. Coll. 97 (4): 1-28.

Snodgrass, R. E., 1930. Insects Their Ways and Means of Living. Smithsonian Sci. Series v. 5. pp. 305-313.

Id., 1935. Principles of Insect Morphology. McGraw-Hill Co.

Swingle, M. C., 1931. Notes on Digestion in Seven Species of Insects. Ann. Entom. Soc. Amer. 24: 177-180.

Wigglesworth, V. B., 1932. On the Function of the So-called "Rectal Glands" of Insects. Quart. Jour. Micro. Sci. 75: 131-150.

Explanation of Plate IV.

Unless otherwise stated all figures are camera lucida drawings of *Callosamia promethea.*

Fig. 1. Diagram of the entire digestive system showing the salivary glands extending along the oesophagus, the sucking stomach, mid-gut, a portion of the Malpighian tubules on one side, the intestine, and rectum.

Fig. 2. A portion of the sucking stomach showing the layer of chitin, very thin epithelial cells, and scattered muscle fibers. Diagrammatic.

Fig. 3. A cross section of the anterior portion of the mid-gut showing the oesophagus completely enclosed within it.

Fig. 4. A section showing the opening of the oesophagus within the mid-gut.

Fig. 5. A section of wall of the mid-gut showing the granular inclusions.

Fig. 6. A portion of a cross section of the intestine showing the inner chitinous layer, the cuboidal epithelial cells, a trachea and muscle fibers.

Fig. 7. A portion of the rectum showing a rectal "gland".

Fig. 8. A Frontal section showing the oesophageal valve. Diagrammatic.

The Generic Name Lethus (Orthoptera and Hymenoptera).

By JAMES A. G. REHN and JOHN W. H. REHN,
The Academy of Natural Sciences of Philadelphia.

In 1934 we described a new genus of Central American Eumastacinae to which was applied the name *Lethus*[1]. This had been checked in Scudder's "Nomenclator Zoologicus", the supplements to the same and the lists of new generic names proposed as recorded in the volumes of the "Zoological Record". Recently our colleague, Dr. B. P. Uvarov, of the British Museum (Natural History), in tallying up Orthoptera generic names which he considers to be preoccupied, has replaced our generic name *Lethus* by the newly proposed *Mayamastax*[2], on the grounds that it is preoccupied "by Lethus Say (1837) (Hymenoptera)".

Regardless of what force one may give to the recent ruling of the International Commission on Zoological Nomenclature that, in proposing substitute names for those said to be preoccupied, full and exact references (to pages where numbered) must be given by the proposer for both the name to be replaced and that which causes the replacement,[3] the logic of these situations would seem to demand such full citation of essential requirements.

We have carefully examined the Sayian use of the name *Lethus* with very interesting results. In the first volume of the Boston Journal of Natural History there appeared as one of the last of Say's contributions, the descriptions of a number of new species of North American Hymenoptera. Apparently the manuscript of this paper was sent to the Boston Society of Natural History either by Say shortly before, or by some one else shortly after, his death on October 10, 1834. The paper was published in two parts, the first appearing in May, 1836, its date of communication to the Society being given as

[1] Mem. Amer. Entom. Soc., no. 8, pp. 5, 37.
[2] Ann. Mag. Nat. Hist., (11) XI, p. 176, (Feb., 1940).
[3] Comptes Rendus XII Congrès Intern. Zool., Lisbonne, I, pp. 186-187.

February, 1835.[4] The second part is printed in the section of the Journal bearing the date of May, 1837. The important point is that Say never saw proof of at least the second part of this paper, as he had been dead nearly three years when it appeared. In addition, the distance of New Harmony, Indiana, where he lived, from Boston, Massachusetts, and the time needed in 1834 for mail to pass between, makes it quite probable that none of the proof was ever read by the author.

In the second part of the paper we find the generic heading "LETHUS F. Latr[5]". From this it is evident Say never intended to propose *Lethus* as a new generic name, and that whatever he wished to use had previously been proposed. Under the genus he described but a single species, *L. spinipes,* which he compared with *"L. cyanipennis* F." The genus *Zethus* is of course a very well-known hymenopterous entity, dating from Fabricius, 1804, and was used by virtually all students at that time including Latreille. To it, in a broad sense, belongs the species *spinipes* described by Say in conjunction with the supposedly preoccupying *Lethus,* and also the compared *cyanipennis* Fabricius, which is usually considered to be a synonym of *Z. mexicanus* (Linnaeus).

Cataloguers of the Hymenoptera, such as Dalla Torre, apparently have considered Say's use of *Lethus* a purely typographical slip for *Zethus,* and so give *Zethus spinipes* as the original proposed combination for that species without comment. In addition the use of *Lethus* as a valid generic name in the Hymenoptera for *spinipes,* which clearly Say never intended it to be, would probably synonymize Saussure's subgeneric name *Zethusculus,* as well as invalidate the properly proposed use of *Lethus* in the Orthoptera.

The key to the whole situation is apparently before us at this time in the priceless series of original letters from Thomas Say to the Rev. J. F. Melsheimer, our early coleopterist, now in the archives of the Academy of Natural Sciences of Philadelphia. In the many lists of technical names contained in

[4] Boston Journ. Nat. Hist., I, p. 209.
[5] Idem, p. 387.

these interesting letters, which cover a period from 1813 to 1825, we find very frequent use of the capital letter "L" and a few of "Z". The former is unmistakable in meaning, but the latter, as used for "Zonitis", has the upper arm of the letter so concave that it could readily be mistaken for the first stroke in making certain handwritten capital "Ls", the remainder of the letter fully carrying out the resemblance, which is not shared by Say's quite sigmoid capital letter "L".

To summarize; Say never proposed *Lethus* as a new genus, he clearly never read the proof of at least the part of his paper in which it appeared, his reference to prior authors showed he had *Zethus* in mind, and his handwriting demonstrates beyond question the marked probability of confusion of his capital letter "Z" for an "L". In our opinion *Lethus* as credited to Say is a clearly evident typographical error, and without validity to preoccupy *Lethus* Rehn and Rehn, 1934.

We might mention that in the same paper as that in which he replaces *Lethus* of Rehn and Rehn, Dr. Uvarov[6] has this to say in re a virtually parallel case: "*Habra* Brunner, 1891 (Tettigoniidae), appears to be preoccupied by *Habra* Agassiz, 1846 (Mollusca), but the latter name is merely an emendation of *Abra* Lamarck, 1818, and therefore itself not valid." Certainly a clearly evident typographical error has no more weight than a puristic emendation.

Unfortunately in the same paper Dr. Uvarov has failed to note a prior replacement of the preoccupied generic name *Dicellura* Rehn and Hebard, 1915, and has renamed it[7], although the original authors several years past detected the preoccupation and renamed it *Dicellurina*,[8] which by particular misfortune is the same word later selected for this use by Dr. Uvarov. The substitution by Rehn and Hebard was properly noted in the body of the "Zoological Record" for 1938, [9] but omitted in the accompanying list of new generic names proposed during the year and abstracted in the volume.

[6] Ann. Mag. Nat. Hist. (11) XI, p. 174.
[7] Idem, p. 173.
[8] Entom. News, XLIX, p. 150, (May, 1938).
[9] Vol. LXXV, p. 417.

How Many Insects are there in the World?

By Z. P. METCALF, North Carolina State College of Agriculture and Engineering of the University of North Carolina.

This being census year it is perhaps not amiss to take a census of our insect population. The possible number of insects in the World has always been a subject of great interest to me. I, of course, refer to the number of kinds of insects or species and not to the number of individuals. No one has been foolhardy enough to attempt to make a world census of insect individuals so far as I am aware. Wolcott (1937a) has recently given us a list of the number of invertebrates collected from one hundred square feet of grassland in New York State. If this figure were taken as the average for the land area of the world, it would be fairly easy to multiply the land surface of the earth by the number of animals per one hundred square feet and arrive at a figure that would be utterly meaningless to any one save an astronomer. Before we get into such figures, however, let us inquire as to the estimated number of kinds of animals in the World. Text-book statements range from 250,000 to 1,000,000 and some hardy soul has recently suggested that there must be at least 10,000,000 species of animals living in the World at the present time. This figure was based upon the maintenance of the present rate in description of new species for another 150 years. Before we condemn such figures as completely fantastic, let us look at the past record. In 1758 Linnaeus established binomial nomenclature and described 312 genera and 4,203 species of animals of all classes, or a ratio of 13 species to each genus. The insects comprised 74 genera and 2,102 species, or a ratio of 28 species to each genus. Of these 1 genus and 42 species were included in what we speak of today as the Homoptera-Cicidina and Fulgorina. This gives a ratio of species of Homoptera to all other animals of 1:100.

Sherborn (1902a) lists all the animals that were described between the years 1758 and 1800. This list includes 3,234 genera and 58,833 species, or a ratio of 18 species to each genus.

Fabricius (1803a) redescribes all the known species of Homoptera. He includes 14 genera and 452 species, a ratio of 13 species to each genus; and a ratio of known Homoptera to all animals of 1:130.

Sherborn (1922a-1933b) lists all the animals described from 1800 to 1850. This list includes 52,214 genera and 363,588 species or a ratio of 8 species to each genus, or a total population of the Animal Kingdom from 1758 to 1850 of 55,448 genera and 422,421 species.

Dohrn (1859a) catalogs the known Hemiptera of the World. He includes 222 genera and 3,259 species or a ratio of 13 species to each genus. If we compare the species of Homoptera listed in 1859 to the rest of the Animal Kingdom, we find a ratio of 1:130; and a ratio of genera to species of 1:8.

Since 1850 the only reliable source of information in regard to the number of new species is found in the Zoological Record. Counting the number of new species every 10 years as recorded in this publication gives us an average of 10,542 new species of insects described each year, 249 species of Homoptera, and 7,253 species of animals not insects.

If these averages are substantially correct they would give us a grand total of 948,780 species of insects since 1850 and a total of 652,770 species of animals not insects. A grand total of 1,601,550 species of animals described since 1850, or a total since 1758 of 2,023,951 species of animals.

There are two methods that we may use to check these figures. In the first place, a careful count shows that we now have in our card catalog of the Homoptera of the World 2,544 genera and 19,882 species. These figures do not include any synonyms. This catalog may be considered complete up to the end of 1937. Our calculations based on the above figures would give us 23,179 species of Homoptera, including synonyms; showing that our calculations are substantially correct. Now if the Homoptera represent 1/125 of the Animal Kingdom, as our figures would seem to indicate, then the total number of described species of animals in the World would be 2,898,625.

There is a second method that may be used. The new Nomenclator Zoologicus will list 225,000 genera. The ratio of species to genera was 8:1 in 1850. If this ratio is maintained today as would be indicated also by the ratio of species to genera in the Homoptera, we would have 1,822,500 described animals in the World.

Averaging the three sets of calculated figures we get an estimated number of 2,500,000 animals and 1,500,000 insects described from 1758 to 1940.

I recognize the limitations of these figures and the many inaccuracies in them, at the same time I believe that they are more accurate than the figures current in most text books. At least they have done this; they have occupied my thoughts on a hazy Indian summer day; their calculations have kept an otherwise idle adding machine busy; and last by no means least important, I hope they have stimulated your thoughts in this field. I trust also, that they will make those of us who profess to be systematists more systematic as we go about our daily business of describing new genera and species, so that those who come after us will not have to do too much counting and recounting, too much learning and unlearning.

And one final conclusion perhaps best expressed in the lines of the ancient limerick:

From figures astronomical
And pains gastronomical
May the good Lord deliver us,
But there's no hope for any of us
As long as so many of us
Have thought quite hysterical.

BIBLIOGRAPHY.

DOHRN, F. A., 1859a. Catalogue Hemipterorum. Herausgegeben von dem Entomologischen Verein zu Stettin 1859: 1-102.

FABRICIUS, J. C., 1803a. Systema Rhyngotorum secundum ordines, genera, species, adiectis synonymis, locis, observationibus, descriptionibus 1803: i-x, 1-21, 1-314.

SHERBORN, C. D., 1902a. Index animalium sive index nominum quae ab A. D. MDCCLVIII generibus et speciebus animalium imposita sunt. Sectio prima a kalendis Ianuariis,

MDCCLVIII usque ad finem Decembris, MDCCC: i-lix. 1-1195.

SHERBORN, C. D., 1922a-1933b. Index animalium sive index nominum quae ab A. D. MDCCLVIII generibus et speciebus animalium imposita sunt. Sectio secunda a kalendis Ianuariis, MDCCCI usque ad finem Decembris, MDCCCL. Parts 1 to 28: i-cxxxi, 1-7056.

WOLCOTT, G. N. 1937a. An animal census of two pastures and a meadow in northern New York. Ecol. Mon. 7: 1-90.

The Cockroach Supella supellectilium in California (Orthoptera: Blattidae).

Information published in the last few years has shown that this circumtropical cockroach has been rapidly extending its distribution within the more austral parts of the United States. Bach (Proc. Entom. Soc. of Wash., XXXIX, pp. 205-213, text figs. 1 and 2, pls. 18 and 19, (1937)) has given a good summary of the subject. Hebard (Trans. Amer. Entom. Soc., LXI, p. 273, (1935)) further reported it from Tucson, Arizona, and Rehn (Entom. News, XLIX, p. 143, (1938)) added Pennsylvania to its distribution.

Recently three immature individuals of this species, representing several instars including that preceding maturity, have been sent to me for determination by Mr. V. E. Williams, Entomologist to the Agricultural Commissioner of Los Angeles County, California. These specimens were collected in a residence at San Bernardino, California, by Mr. John R. Coy, Agricultural Commissioner of San Bernardino County, April 8, 1940.

This record extends the range of the species within the United States to California, thus giving it a distribution extending from Pennsylvania to southern California, northward in the interior to Nebraska, Missouri, Illinois (Chicago and Urbana) and Indiana (Indianapolis). It was first recorded from the United States at Miami, Florida, by the present author in 1903 (Entom. News, XIV, p. 125)) as the synonymic *Phyllodromia cubensis.*

JAMES A. G. REHN, Academy of Natural Sciences of Philadelphia.

The Life History of the American Cockroach, Periplaneta americana Linn. (Orthop.: Blattidae).

By PHIL RAU, Kirkwood, Missouri.

(Continued from page 189.)

PERIOD OF INCUBATION.

A hundred adult American cockroaches arrived from New Orleans in June, 1937, egg-cases began to protrude from the bodies of some females two to three days later. Forty of these were placed in separate vials as they were deposited, during the months of June and July for the purpose of noting the number of days required for the hatching of the eggs.

Incubation No. of days	Frequency
38	2
39	1
40	1
41	6
42	7
43	5
44	9
45	2
46	2
47	0
48	3
49	2
Total	40

Thus we see that the period of incubation varied from 38 to 49 days, the greatest frequency being between 40 and 45 days (two-thirds of the number having hatched in that length of time.) The figures are computed from the time the egg-cases are dropped by the mothers. The egg-cases, as already stated, are carried by the mothers for from one-half day to four days and development undoubtedly starts when the egg-case is first protruded; therefore, the period of incubation for each egg-case may be anywhere from one-half to four days greater than the figures in the table show. Nigran* in India, finds the period of incubation for this species to be 27 to 28

* Indian Journ. Agric. Sci. 3: 530-543, 1933.

days when egg-cases are kept in a warm moist place. He cites Haber in Minnesota who finds that at a temperature of 77 degrees it requires 70 days. By way of comparison it is interesting to know that the period of incubation for the oriental roach is from 45 to 56 days (Trans. Acad. Sci. St. Louis 25: 66, 1924), and that of the Woodroach *P. pennsylvanicus* is from 30 to 41 days (Ent. News 51: 8, 1940).

THE NUMBER OF YOUNG TO HATCH FROM EACH EGG-CASE.

The number of young to hatch from each egg-case is actually the number of eggs deposited since there is usually no mortality. This study was made on the 40 egg-cases mentioned under the heading "Period of Incubation" with the following results:

No. of Eggs in Egg-Case	Frequency
6	2
8	3
9	2
10	6
11	2
12	8
13	1
14	11
15	2
16	3
Total	40

In the foregoing table we see that the number of eggs contained in 40 egg-capsules varied from 6 to 16, the greatest frequency being those containing 10 to 16—three-fourths of them having that number. Nigran, in India, found 16 eggs to the egg-capsule and cites Laing who mentions the maximum number as 14. He also cites Haber, in Minnesota, who "found 18 to 28 eggs in the egg-cases, 20 to 24 being common." Comparing the normal number, 10 to 16 eggs per egg-capsule, with those of *B. orientalis* and *P. pennsylvanica,* we find orientalis depositing 12 to 18 eggs per capsule (Rau *loc. cit.,* p. 70) and pennsylvanica, 18 to 30 eggs per capsule (Rau, *loc. cit.,* p. 8).

NUMBER OF EGG-CASES DEPOSITED BY EACH MOTHER.

No. of egg-cases deposited by each mother.	Frequency
6	1
7	2
8	5
9	3
10	3
11	2
12	3
14	1
	Total 20

These egg-cases deposited by 20 mothers covered a period from June 5 to August 29; the smallest number of egg-cases deposited by any one mother was 6, the largest number was fourteen, and the average number was 9½ per mother. In the Woodroach (Rau, *loc. cit.*, p. 6-7) we find mothers depositing from 3 to 11 egg-cases, and in the oriental roach from 1 to 4 egg-cases (Rau, *loc. cit.*, p. 63).

LAPSE OF TIME BETWEEN DEPOSITING EGG-CASES.

Records were kept on the number of days that intervened between the dropping of egg-cases by the same 20 mothers referred to in the previous paragraphs. The data on the period of time which elapsed between layings in 133 instances are recorded in the table below.

No. of days interval between two egg-cases.	Frequency
2	9
3	18
4	19
5	17
6	15
7	13
8	7
9	9
10	1
11	5
12	4
13	4
14	1
15	3

16	2
17	1
19	2
31	1
40	1
53	1
Total	133

Thus we see that the time interval between deposition of egg-cases varies from 2 days to 19 days with three extraordinary exceptions in which the period was 31, 40 and 53 days. However, out of the 133 records, 107 or nearly two-thirds of them have a time interval between layings of from 2 to 9 days.

LAPSE OF TIME BETWEEN ARRIVAL AT KIRKWOOD AND DEPOSITION OF FIRST EGG-CASE.

The 20 mothers considered in this study began egg-laying after a lapse of the following number of days:

No. of Days	Frequency
3	2
4	2
6	5
7	2
8	5
11	1
12	2
21	1

The lapse of time according to the table varied from 3 to 21 days, but since they were adults when they arrived from New Orleans, I have no way of knowing if these were the first egg-cases deposited by the mothers.

LAPSE OF TIME BETWEEN DEPOSITION OF LAST EGG-CASE AND DEATH OF MOTHER.

Records were kept on the number of days ten mothers lived after depositing their last egg-case.

No. of Days	Frequency
4	1
10	2
29	1
34	1
39	1
42	1
45	1

48	1
65	1

Thus we see the length of life is quite variable after deposition of the last eggs, but we do not know whether they died after depositing the last eggs or whether, had they lived longer, more egg-cases would have been deposited.

PARASITES OF THE EGG-CASES.

Concealing the egg-cases by covering them with bits of surrounding material was an almost 100% factor in saving them from being devoured by other roaches; concealing them, however, did not save them from the onslaughts of certain hymenopterous parasites, who found them in spite of their protective coloration. One parasite that found two of the concealed egg-cases, after entering the glass-covered fish globe, was the Chalcid-wasp, *Melittobia chalybii* Ash. [A. B. Gahan det.]. The parasites emerged from the egg-cases of *P. americana* in mid-October, 1938. These egg-cases were among a few which I had placed in separate vials for other studies, but how many more were parasitized that missed my attention, I do not know. The parasites were probably brought into the laboratory with mud nests of *Sceliphron caementarium,* and this, I think, is the first record of *Melittobia* parasitizing the egg-cases of a cockroach.

(To be continued.)

The Occurrence of Gryllus domesticus L. in Maine (Orthop.: Gryllidae).

Early in the autumn of 1939, *Gryllus domesticus* was apparently introduced into Coburn Hall on the University of Maine campus. By the middle of May large numbers were present in the warm basement, where their sharp chirping was to be heard at almost any time during day or night. As the presence of this insect in Maine apparently has not been recorded before, the following records in addition to Orono are listed: Augusta, Bath, Biddeford, and Portland. The writer acknowledges the receipt of these records from Mr. H. B. Peirson and Dr. C. O. Dirks.

MERLE W. WING.

Current Entomological Literature

COMPILED BY V. S. L. PATE, L. S. MACKEY and E. G. FISHER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( )follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Agnew, M. A.—Workers in subjects pertaining to agriculture in land-grant colleges and experiment stations. [U. S. Dept. Agric.] Misc. Pub. No. 378: 170 pp. **Alexander, C. P.**—The Presidential Range of New Hampshire as a biological environment, with particular reference to the insects. [Amer. Mid. Nat.] 24: 104-132, ill. **Allen, Holloway & Haeussler.**—Importation, rearing and colonization of parasites of the oriental fruit moth. [U. S. Dept. Agric.] Circ. No. 561: 61 pp., ill. **Anon.**—El insecto fosil mas antiguo conocido. [Ciencia] 1: 225. **Bishop, E. L.**—Cooperative investigations of the relation between mosquito control and wildfire conservation. [68] 92: 201-202. **Blatchley, W. S.**—Obituary. [12] 33: 588-589. **Bondar, G.**—Insetos Daninhos e Parasitas do Cacau na Bahia. [Inst. Cacau da Bahia] Bol. Tec. No. 5: 112 pp., ill. **Britton, W. E.**—Obituary by R. B. Friend. [Conn. Agric. Exp. Sta.] Bull. 434: 215-221. **Carpenter, F. M.**—Carboniferous insects from the Stanton Formation, Kansas. [Amer. Jour. Sci.] 238: 636-642, ill. (*). **Christensen, J. R.**—Estudios anatomicos del tubo digestivo de algunos insectos argentinos. [69] 17: 265-273, ill. **Conard, H. S.**—Bees raise questions. [Sci. Monthly] 51: 57-64. **Cott, H. B.**—Adaptive coloration in animals. London, 1940. 508 pp., ill. **Dobzhansky, T.**—Speciation as a stage in evolutionary divergence. [90] 74: 312-321. **Hertig, M.**—Glass tubes for

rearing Phlebotomus and other insects. [68] 92: 91-92. **Mas, P. F.**—In memoriam R. P. Longinos Navas, S. J. [Rev. Soc. Iberica Cien. Nat.] 36: 6 pp. **von Oettingen, H.**—Versuche zur verhinderung von schimmelbildung bei der bearbeitung trockener insekten. [109] 7: 67-71. **Scourfield, D. J.**—The oldest known fossil insect. [31] 145: 799-801, ill. **Tanner, V. M.**—A biotic study of the Kaiparowits Region of Utah. [Great Basin Nat.] 1: 97-126, ill. **Testout, H.**—Procédés pour la conservation des collections d'insectes. [Bull. Mens. Soc. Linn. Lyon] 8: 103-110.

ANATOMY, PHYSIOLOGY, ETC.—Bourquin, F.—Metamorfosis de "Racheospila gerularia" (Geometrid.). [69] 17: 385-391, ill. Metamorfosis de "Eudesmia argentinensis" (Lithosiid.). [69] 17: 393-398, ill. Metamorfosis de "Cerura annulifera" (Notodontid.). [69] 17: 399-408, ill. Metamorfosis de "Plutella maculipennis" (Plutellid.). [69] 17: 409-413, ill. Metamorfosis de "Pholisora similis" (Hesperid.). [69] 17: 415-418, ill. Metamorfosis de "Pilocrocis leucoplagalis" (Pyralidid.). [69] 17: 419-422, ill. Metamorfosis de "Lephygma frugiperda" (Noctuid). [69] 17: 423-441, ill. **Campau, E. J.**—The morphology of Chauliognathus pennsylvanicus (Cantharid.). [Microent.] 5: 57-85, ill. **Carrick & Bullough.**—The feeding of the tick, Ixodes ricinus in relation to the reproductive condition of the host. [116] 32: 313-317, ill. **Crescitelli & Jahn.**—Electrical activity of the invertebrate eye in response to illumination. [Proc. Iowa Acad. Sci.] 46: 451-452. **Deoras, P. J.**—Structure of Hemimerus deceptus, var. ovatus, and the classification of Dermaptera. [31] 146: 201. **Dooley, T. P.**—The influence of colchicine on the germ cells of insects, Melanoplus differentialis and Gryllus assimilis, with special reference to the cytoplasmic inclusions. [Pro. Iowa Acad. Sci.] 46: 445. **Eloff, G.**—Observations on the mode of connection between nucleous and chromocentre in salivary gland nuclei of some South African Drosophilids. [S. Afr. J. Sci.] 36: 359-363, ill. **Ferris, G. F.**—The myth of the thoracic sternites of insects. [Microent.] 5: 87-90. **Fraenkel & Rudall.**—A study of the physical and chemical properties of the insect cuticle. [Pro. Ry. Soc. London] 129 (B): 1-35, ill. **Furukawa, H.**—Regeneration of forceps in Anisolabis maritima. [Japanese Jour. Zool.] 8: 467-477, ill. Transplantation-experiments on appendages of Anisolabis maritima. [Japanese Jour. Zool.] 8: 479-535, ill. **Greigy & Ochse**

—Schnürungsversuche an larven von Sialis lutaria. [Rev. Suisse Zool.] 47: 193-194. **Ghidini, G. M.**—Ricerche sul quoziente respiratorio nelle diverse caste di Reticulitermes lucifugus. [Riv. Biol. Colon. Roma] 2: 385-399. **Ghidini & Moriggi.**—Sulle concrezioni pericardiali nelle termiti. [Riv. Biol. Colon., Roma] 2: 345-353, ill. **Greiff, D.**—Longevity in Drosophila melanogaster and its ebony mutant in the absence of food. [90] 74: 363-376. **Johnson, C. G.**—Development, hatching and mortality of the eggs of Cimex lectularius in relation to climate, with observations on the effects of reconditioning to temperature. [116] 32: 128-173, ill. The longevity of the fasting bedbug (C. lectularius) under experimental conditions and particularly in relation to the saturation deficiency law of water-loss. [116] 32: 239-270, ill. **Kato, M.**—The general consideration of the diurnal activity of the strawberry weevil, Anthonomus bisignifer, with special reference to the body temperature of the weevil and the environmental temperature factors. [Sci. Rep. Tohoku Imp. Univ.] 15: 179-189, ill. **Lloyd, D. C.**—Host selection by hymenopterous parasites of the moth Plutella maculipennis. [Pro. Ry. Soc. London] 128 (B): 451-484, ill. **Miller, D. F.**—Insect cultures inbred for 200 generations. [68] 92: 147-148. **Oliver, C. P.**—A reversion to wild-type associated with crossing-over in Drosophila melanogaster. [Pro. Nat. Acad. Sci. U. S. A.] 26: 452-454. **Pardi, L.**—I corpi grassi degli insetti. [Redia] 25: 87-288, ill. **Richardson & Ellisor.**—Effect of pH on the toxicity of nicotine injected into the cockroach Periplaneta americana. [Iowa State Coll. Jour. Sci.] 14: 305-316, ill. **Stella, E.**—Alcuni dati citologici sulle gonadi di soldati di Bellicositermes bellicosus. [Riv. Biol. Colon., Roma] 2: 255-262. **Vialli, M.**—Ricerce preliminari sul secreto di Pheropsophus africanus. [Riv. Biol. Colon., Roma] 2: 273-277, ill.

ARACHNIDA AND MYRIOPODA.—Bryant, E. B.—Cuban spiders in the Museum of Comparative Zoology. [Bull. Mus. Comp. Zool. Harvard] 86: 255-532, ill. (*). **Bucherl, W.**—Os Quilopodos do Brasil. [Mem. Inst. Butantan] 13: 49-362, ill. **Carrick & Bullough.**—See under Anatomy. **Chamberlin, R. V.**—New American Tarantulas of the family Avicullariidae. [Bull. Univ. Utah] 30: 39 pp. **Chamberlin & Ivie.**—Agelenid spiders of the genus Cicurina. [Bull. Univ. Utah] 30: 108 pp., ill. (*k). **Guimarães,**

L. R.—Malófagos da cigana. [Opisthocomus hoazin]. [Arq. Zool. Est. São Paulo] 1: 283-317, ill. **Herman, C. M.**—(see **under Neuroptera). .Martin, H. M.**—Ticks. [Forest Leaves] 1940: 3, 11-13, ill. **de Mello-Leitão, C.**—Algunas Arañas nuevas de la Argentina. [Rev. Mus. de la Plata] 1: 89-118, ill. (*). Une araignée argentine type d'une sous famille nouvelle (Corinoctenus anomalostomus n. sp.). [69] 17: 137-142, ill. A propos d'un nouveau Oonopide myrmeciphile de l'Argentine. [69] 17: 143-145, ill. Les arachnides et la zoogeographie de l'Argentine. [69] 17: 601-630. (*). Sete generos e vinte e oito especies de Gonyleptidae. [Arq. Zool. Est. Sao Paulo] 1: 1-51, ill. Sur une phryne cavernicole de Bahia-Trichodamon froesi, sp. n. [An. Acad. Brasileira Sci.] 12: 131-135, ill. Mais alguns novos opilioes Sul-Americanos. [An. Acad. Brasileira Sci.] 12: 93-107. **Moreno, A.**—Contribucion al estudio de los escorpionidos cubanos. Fam. "Buthidae", Addendus. [115.] 14: 161-164, ill. (*k). Pedipalpida emmendata [Mem. Soc. Cubana Hist. Nat.] 14: 167-168. (*). **Plomley, N. J. B,**—Notes on the systematics of two species of Heterodoxus (Boopid.). [Pap. & Proc. Roy. Soc. Tasmania] 1939: 19-26, ill. **Prado, A.**—Contribuicao ao conhecimento dos escorpioes Sul-Americanos. [Mem. Inst. Butantan] 13: 25-36, ill. **Prado y Rios-Patino.**—Contribucion al estudio de los escorpiones de Colombia. [Mem. Inst. Butantan] 13: 41-43, ill. **Schmidt, F. L.**—Entonyssus vitzthumi, a new Ophidian lung mite. [Jour. Parasit.] 26: 309-313, ill. **Schuhardt, V. T.**—A "ticktorium" for the propagation of a colony of infected Ornithodoros turicata. [Jour. Parasit.] 26: 201-206, ill. **de Toledo Piza, S.**—Novos Gonyleptidae do Brazil. [Arq. Zool. Est. São Paulo] 1: 53-64, ill.

THE SMALLER ORDERS OF INSECTS—Adamson, A. M.—New termite intercastes. [Pro. Ry. Soc., London] 129 (B): 35-53, ill. (s) **Arlé, R.**—Quelques Collemboles de l'etat d'Espirito Santo. [69] 17: 125-131, ill. (*). **Buxton, P. A.**—The biology of the body louse (Pediculus humanus corporis: Anoplura) under experimental conditions. [116] 32: 303-312. **Coutinho, J. O.**—Observações sôbre algumas espécies de Flebótomos com a descrião do macho de Flebotomus lloydi. [Arq. Zool. Est. São Paulo] 1: 331-338, ill. **Deoras, P. J.**—Comparative morphology and evolutionary trends in Trichoptera. [31] 145: 976. **Fox, I.**—Siphonaptera from western United States. [91] 30: 272-276, ill.

(*). **Herman, C. M.**—Parasites obtained from animals in the collection of the New York Zoological Park during 1938. [Zoologica] 24: 481-485. **Navas, R. P. L.**—Comunicaciones Entomologicas. 4. Insectos exoticos nuevos, criticos o poco conocidos. [Rev. Acad. Exac. Nat., Zaragoza] 6: 12-13. (*s). **Scourfield, D. J.**—(see under General).

ORTHOPTERA.—Bruch, C.—Algunas observaciones biologicas sobre "Schistocerca infumata." [Rev. Mus. de la Plata] 1: 209-216, ill. **Deoras, P. J.**—See under Anatomy. **Gunther, K.**—Revision der Acrydiinae, III. [Abhandl. Ber. Staatl. Mus.] 20, (A): 16-329, ill. (k). **Hubbell & Cantrell.**—A new species of Appalachia from Michigan (Acridid; Cyrtacanth.). [Occas. Pap. Mus. Zool,, Univ, Mich.] No. 389, (1938): 22 pp., ill. **de Mello-Leitao, C.**—Estudia monográfico de los Proscópidos. [Rev. Mus. de la Plata] 1: 279-449, ill. (k*s). **de Toledo Piza Jumior, S.**—Phasmidas do Museu Argentino de Sciencias Naturaes. [69] 17: 113-116. (*). **Uvarov, B. P.**—Twenty-four new generic names in Orthoptera. [75] 6: 112-117.

HEMIPTERA.—Blanchard, E. E.—Estudio sistematico de los Afidoideos argentinos. [69] 17: 857-1003, ill. (*). **da Costa Lima, A.**—Novo Hemiptero Reduviideo da subfamília Vesciinae. [Arq. Zool. Est. São Paulo] 1: 485-490, ill. **Drake & Poor.**—Some Tingitidae from the Republic of Argentina. [69] 17: 95-98, ill. (*). **Lallemand, V.**—Description de deux nouveaux cercopides provenant de l'Argeńtine. [106] 129: 186-187. (*).

LEPIDOPTERA.—Clarke, J F. G.—A study of the North American moths formerly referred to Delta, with two new species (Phalaenid.). [38] 39: 39-52, ill. (k). **Comstock & Henne.**—Notes on the early stages of Nemoria pistaciaria. [38] 39: 78-80, ill. **Ferreira d'Almeida, R.**—Revisão do género Phoebis. (Pieridid.). [Arq. Zool. Est. São Paulo] 1: 67-152, ill. **Filho, L. T.**—Nova espécie de Ecdemus (Euchromiid.) [Arq. Zool. Est. São Paulo] 1: 319-329. **Hayward, K. J.**—Hesperioidea argentina. Especies nuevas o poco conocidas de la Fauna argentina. [69] 17: 279-301, ill. Las especies argentinas del género "Butleria". [69] 17: 303-310, ill. Descripción de una nueva especie de

"Speocropia". (Acronyct.). [69] 17: 311-316, ill. Contribución al conocimiento de las "Riodinidae" argentinas. [69] 17: 317-374. (*). Ropalóceros de las Yungas de Bolivia. [69] 17: 375-384. **Henne, C.**—Two new species of Lepidoptera from California. [38] 39: 71-74. (*). **Hoffmann, C. C.**—Lepidopteros nuevos de Mexico. [An. Inst. Biol. Mex.] 11: 275-284, ill. **Klots, A. B.**—The silvery-striped species of California (Pyralidid.). [38] 39: 53-70, ill. (k*). **Koehler, P.**—Especies nuevas de "Satyridae" y complemento a mi "Prodromus". [69] 17: 443-447. Contribución al estudio de los "Noctuidae" argentinos. [69] 17: 449-455. Notas sobre "Psychidae" argentinos. [69] 17: 457-471, ill. Parásitos de "Psychidae" argentinos. [69] 17: 473-494, ill. **Maria, H. A.**—Miscelanea entomologica. [Rev. Acad Colombiana Cien. Exact., Fis. y Nat.] 3: 332-336, ill. (k). **Moore & Rawson.**—A new Noctuid from Michigan. [Occas. Pap. Mus. Zool., Univ. Mich.] No. 395: 2 pp., ill, **Schaus, W.**—Insects of Porto Rico and the Virgin Islands. Moths of the family Noctuidae [Sci. Surv. Porto Rico & Virgin Ids.] 12: 177-290. (*k).

DIPTERA.—Carrera, M.—Novas espécies do género Rachicerus. [Arq. Zool. Est. São Paulo] 1: 387-398, ill. **Edwards, Oldroyd & Smart.**—(see under Special). **da Fonseca & da Silva Ramos.**—Novo subgenero e novas especies de Anofelinas neotropicas. (Culicid). [Mem. Inst. Butantan] 13: 383-387, ill. **Fraga, A.**—El género "Listriosca" de la subfamilia "Pangoniinae". [69] 17: 149-155, ill. **Goncalves, C. R.**—Biologia de uma ("Pseudiastata" depredadora de "Pseudococcus brevipes" Diastatid.). [69] 17: 103-112, ill. **Hering, E. M.**—Neue alt-und neuweltiche bohrfliegen. (Trypetidae). [109] 7: 50-57, ill. (*). **Hertig, M.**—See under General. **Del Ponte, E.**—Revision de los "Oestridae" argentinos. [69] 17: 525-534. (*). **Reid, W. J.**—Biology of the seed-corn maggot in the coastal plain of the South Atlantic States. [U. S. Dept. Agric.] Tech. Bull. 723: 43 pp., ill. **de Souza Lopes, H.**—Sobre alguns Sarcophagideos de Misiones. [69] 17: 117-123, ill. (*). **Steyskal, G. C.**—New Stratiomyidae and Tetanoceridae from North America. [Occas. Pap. Mus. Zool., Univ, Mich.] No. 386, (1938): 10 pp., ill. **Vargas, L.**—Aedes bimaculatus, del estado de Campeche, Mexico. Descripcion del Macho. [Rev. Soc. Mex. Hist. Nat.] 1: 103-107, ill.

COLEOPTERA.—Blackman, M. W.—The scolytid beetles of the genus Renocis, with descriptions of nine new species. [50] 88: 373-401, ill. (k*). **Campau, E. J.**—(see under Anatomy). **Cazier, M. A.**—New American Diplotaxis (Scarab.) [Great Basin Nat.] 1: 127-137. **Chapin, E. A.**—New genera and species of lady-beetles related to Serangium (Coccinell.). [91] 30: 263-272, ill. (sk). **Dallas, E. D.**—Monografia de "Calosoma argentinense (Carabid.). [69] 17: 771-789, ill. (*). **Denier, P. C. L.**—Descripcion de dos especies nuevas de "Bichos Moros" del Gran Chaco (Meloid.). [106] 129: 179-185, ill. (*s). **Hustache, A.**—Curculionides nouveaux. [106] 129: 112-144; 272-284. (s). **John, H.**—Eine neue species von Holophygus (Notiophygid.). [109] 7: 71-75, ill. (s). **Linsley, E. G.**—A generic revision of the tribe Methiini. (Cerambycid.). [38] 39: 28-38. (k). **Monte, O.**—Notas sôbre alguns Tingitideos do Brasil. [Arq. Zool. Est. São Paulo] 1: 375-381. **Ogloblin, A. A.**—Un Oedemérido perjudicial a la "yerba mate" (Copidita argentina). [69] 17: 227-244, ill. **Pierce, W. D.**—The dune case-bearer beetles of the genus Exema, with review of the genus. [38] 39: 6-27, ill. (*k). **Saylor, L. W.**—Ten new West Indian scarab beetles of the genus Phyllophaga, with two new names. [J. Wash. Acad. Sci.] 30: 305-314, ill. (*). **Voris, R.**—The relationships among the Staphylininae as expressed by their larval forms, Coleoptera, Staphylinidae. [Pro. Missouri Acad. Sci.] 5: 115-116. **Voss, E.**—Ueber neue und wenig bekannte russlerarten aus der neotropischen region, vorwiegend aus Brasilien. [109] 7: 1-16, ill. **Zimmerman, E. C.**—Synopsis of the genera of Hawaiian Cossoninae with notes on their origin and distribution (Curculion.). [Occas. Pap. B. P. Bishop Mus.] 15: 271-293, ill.

HYMENOPTERA.—Blanchard, E. E.—Los Sarcofágidos argentinos. Contribucion a su conocimiento. [69] 17: 791-856, ill. (*). **Burks, B. D.**—Revision of the chalcidflies of the tribe Chalcidini in America north of Mexico. [50] 88: 237-354, ill. **Cristobal, U. L.**—"Calliephialtes argentinus". Icneumonoideo de la serie parasitica enemigo del gusano de las frutas, nuevo para la ciencia apto para la lucha biologica. [69] 18: 477-486, ill. **Maa, T.**—On the nomenclature of certain Xylocopa-species. [Notes d'Ent. Chinoise] 7: 131-138. (*). **Ogloblin, A. A.**—Sobre la sino-

nimia del Mimarido parasito del gorgojo de Eucalyptus (Mymarid.). [Mem. Jardin Zool. La Plata] 9: 143-144. (*s). Descripción de un género nuevo de la familia "Mymaridae". [69] 17: 217-225, ill. **Sandhouse, G. A.**—A review of the nearctic wasps of the genus Trypoxylon. (Sphecidae). [Amer. Mid. Nat.] 24: 133-176, ill. **de Santis, L.**—Sobre un nuevo afelinido Argentino (Chalcid.). [Not. Mus. de la Plata] 5: 23-29, ill. (*). **Taylor, L. H.**—The hornets and yellow-jackets (Vespinae) of West Virginia. [West. Va. Univ. Bull.] 13: 33-36. **Viana, M. J,**—Notas sobre la biologica de "Parapechthis bazani". [69] 17: 261--264.

SPECIAL NOTICES.—British Blood-sucking Flies. By Edwards, Oldroyd & Smart. Brit. Mus. Nat. Hist. 1939. 156 pp., ill.

THE FABRICIAN TYPES OF INSECTS IN THE HUNTERIAN COLLECTION AT GLASGOW UNIVERSITY. COLEOPTERA, Part II, by ROBERT A. STAIG, M.A., Ph.D., F.R.S.E., Lecturer in Zoology (Entomology) University of Glasgow. Cambridge: at the University Press. New York: The Macmillan Co., 1940. $7.60. This, the second volume in a series, has 164 pp. of text, a two page introduction, an index and a supplement to volume I. There are colored plates of the thirty one species described in the Families Endomychidae, Coccinellidae, Helodidae, Buprestidae, Elateridae, Tenebrionidae, Oedemeridae, Rhipiphoridae, Meloidae and Pyrochroidae.

The descriptions of the 28 Fabrician and 3 Olivierian types are very full and as good as can be expected, considering the condition of the material examined. In addition to the above there are notes on other species contained in the Hunterian collection. The only criticism I can offer is that the author did not designate lectotypes in the cotypic series; if this had been done the types would have been fixed for all time. The colored plates are all full-paged drawings by Miss Margaret Wilson, D.A. (G.S.A.) and the detail and coloring are much better than in the usual illustrations of this kind.

The following fourteen species figured, are found in the United States fauna: 56. *Aphorista (Tritoma) vittata* (Fab.),

Mant. Ins. I, p. 44, No. 4 (1787). 57. *Brachyacantha (Coccinella) ursina* (Fab.), Mant. Ins. I, p. 61, No. 98 (1787). 58. *Ceratomegilla (Chrysomela) 10-maculata* (Fab.), Syst. Ent. p. 105, No. 60 (1775). 59. *Hippodamia (Coccinella) glacialis* (Fab.), Syst. Ent. p. 80, No. 12 (1775). 73. *Buprestis fasciata* (Fab.), Mant. Ins. I, p. 177, No. 13 (1787). 78. *Agrilus (Buprestis) ruficollis* (Fab.), Mant. Ins. I, p. 184, No. 85 (1787). 80. *Hemirrhipus (Elater) fascicularis* (Fab.), Mant. Ins. I, p. 171, No. 2 (1787). 84. *Hoplocephala (Hispa) bicornis* (Fab.), Gen. Ins. p. 215, No. 3-4 (1776). 8. *Macrosiagon (Mordella) dimidiatum* (Fab.), Sp. Ins. I, p. 332, No. 5 (1781). 89. *Macrosiagon (Mordella) limbata* (Fab.), Sp. Ins. I, p. 332, No. 6 (1781). 90. *Macrosiagon (Mordella) sexmaculata* (Fab.), Syst. Ent. p. 263, No. 4 (1775). 92. *Epicauta (Lytta) atrata* (Fab.), Syst. Ent. p. 260, No. 4 (1775). 93. *Epicauta (Lytta) vittata* (Fab.), Syst. Ent. p. 260, No. 3 (1775). 97. *Neopyrochroa (Pyrochroa) flabellata* (Fab.), Mant. Ins. I, p. 162, No. 2 (1787).

In addition to the above there are many other species from Central and South America.

The present European conditions increase the value of books of this character and it is to be hoped that Dr. Staig will be able to finish his series on the Hunterian collection before too much time has elapsed.—MARK ROBINSON.

A New Generic Name to Replace Sigmoidella Hebard, Not of Cushman and Ozana (Orthoptera: Blattidae).

Our colleague Dr. B. P. Uvarov, of the British Museum (Natural History), has kindly called my attention to the fact that the generic name *Sigmoidella*, proposed by me in 1929 for a Malayan member of the Blattidae (Proc. Acad. Nat. Sci. Phila., LXXXI, pp. 39, 55, (April 15, 1929)) is preoccupied by *Sigmoidella* Cushman and Ozana in Foraminifera (Contrib. Cushman Labor. Foramin. Research, IV, p. 18, (March 3, 1928)). This unfortunate duplication to due to nearly contemporaneous work, and the fact that the list of new generic names in the "Zoological Record" for 1928 was not available in Philadelphia until December 4, 1929. To replace my preoccupied *Sigmoidella* of 1929 I propose the name *Sigmella*. —MORGAN HEBARD, Philadelphia, Penna.

IN MEMORIAM

Kenneth J. Morton

[A note of five lines in the News for March, 1940, page 73, announced the death of Mr. Kenneth J. Morton. Lt.-Col. F. C. Fraser, well-known for his work on the Odonata of British India and an intimate correspondent of Mr. Morton, voluntarily and kindly sent us the following notice.]

Entomology and British entomology in particular, has suffered a great loss in the death of Mr. Kenneth J. Morton which occurred on January 29th of this year, at Edinburgh. Robust and full of vigour to the last, although in his 82nd year, his sudden end naturally came as a great shock to his many friends. With his passing, we see the last of an old and eminent school of British entomologists, whose names will ever be household words in the world of entomological science.

Mr. Morton was born at Carluke, Lanarkshire, Scotland, in 1858 and it was there that he received his education. At the early age of sixteen he entered the British Linen Bank, being first employed at their Glasgow branch. Rather than be divorced altogether from his beloved country-side, he travelled to and from Carluke daily by train. In 1897 he was transferred to Edinburgh where he remained until his retirement in 1922. The remaining years of his life were devoted entirely to the study of entomology, a taste for which he had evinced from his earliest youth.

Like many other entomologists, his first love was for the Lepidoptera of which he acquired a fine collection of British species. At about the age of eighteen however, he began to extend his interests to other orders, which quickly eclipsed that for the Lepidoptera. He believed in generalising in all orders but specializing in a few, a sound principle which enabled him to follow the work of other entomologists even if they were concerned with orders which he did not himself specially study. He was extremely conservative in his views on nomenclature and also preferred to employ the old venational notation and formulae in preference to more modern ones; although not questioning the correctness of these latter, he abhorred constant

changes and thought these only tended to confusion. More especially was he jealous of the nomenclature of the ancient entomologists and of the British in particular. The substitution of the names *Boriomyia betulina* Strom and *Sympetrum danae* Sulzer on the strength of crude figures, one of which was admitted to be *quite impossible to identify with certainty* by the sub-committee responsible, he regarded as "utterly unscientific" and "a gross scandal". He considered that a greater use of the *nomen conservandum* should have been employed, even where there was good reason for a change in the names.

Those who knew him best and longest, as did the writer for some twenty-five years, can testify to his genial character and charm of manner. No better epitaph could be written of him than this passage from a letter by his daughter: "he led a peaceful and good life as a citizen, husband and father".

Some have said that it was impossible to get an opinion from him, but nothing could be further from the truth. Like most Scots, he was extremely cautious and would weigh long and carefully all arguments for and against before expressing an opinion, so that when it was forthcoming, it could be relied upon as sound and his judgment accepted. He was the "perfect correspondent"; no letter went unanswered and all were answered at great length; indeed he had marked talent in this respect and many of his letters read like pages from Gilbert White.

The orders in which he specialized were the Odonata, Trichoptera, Neuroptera, Plectoptera, Mecoptera and the Apoidea of the Hymenoptera. The fine collections which he made in all these and of which some are rich in types, and most of his books have gone to the Royal Scottish Museum. Of his field work in these, perhaps the best remembered was his rediscovery of *Macromia splendens* Pictet, in France, after it had defied the efforts of all continental collectors for nearly fifty years.

In his early days, his favorite collecting grounds were the banks of the Clyde, and Scotland always remained his preferred country for this purpose, yet he made numerous excursions to the Continent of Europe to collect Odonata, Neuroptera and

Trichoptera: France was visited on four occasions, Switzerland twice, and Norway, Italy, Corsica, Austria and Spain on other trips. On all these expeditions he wrote valuable papers which were supplemented by others on collections made for him by many willing helpers. The most valuable of these latter dealt with the Odonate fauna of the Near and Middle East and Yunnan, China. His contributions to the literature of the orders in which he specialized ran into well over sixty papers and lengthy notes.

Mention must be made of two long and close associations which he formed with McLachlan and Dr. Ris. The former he first corresponded with in 1883 although he did not actually make his acquaintance until McLachlan visited Scotland in 1886. The author has come into possession of the McLachlan-Morton correspondence, and some 750 letters lie before him to testify to the close cooperation between these two entomologists. It was McLachlan who introduced Morton to Dr. Ris, urged to do this by their common love of the Odonata. This was in 1893, and he first met Ris when he visited Switzerland in 1904. This association lasted until Ris's death in 1931 and during that time some 250 letters passed between them, dealing mainly with the classification of the Odonata.—F. C. F.

Mr. Morton corresponded with Professors Needham and Kennedy, the late E. B. Williamson, the writer and perhaps others in the United States on Trichoptera and Odonata. His letters to me run from March 6, 1904, to December 4, 1939, and I had the great and enjoyable privilege of spending some days at his home in Edinburgh, in July, 1912. For many years it was our custom to exchange fairly lengthy letters at about Christmas, if not more frequently, and it is a keen source of sorrow to me that I can no longer look forward to his welcome and cheery greetings. From his letter of April 17, 1931, referring to the then recent death of Dr. F. Ris, I take this passage:

"The remarks about Ris's early school days recall my own. In rural villages in Scotland nearly all boys and girls went to the Parish School. The teachers as a rule were excellent. My own teacher was capable of giving tuition in the classics and

mathematics which enabled pupils to pass direct to the Universities. There was, however, no University for me as I began my career at the Bank at 16 and retired in 1922."

Dr Cornelius Betten, in the bibliography to his "Caddis Flies or Trichoptera of New York State" (Bull. 292, N. Y. State Museum, 1934), lists forty-five papers by Morton, from 1883 to 1930, on these insects. Two of them deal especially with American species. One is "North American Hydroptilidae" (Bull. 86 of the same Museum, pp. 63-75, 1905), in which eleven new species and one new genus, *Neotrichia,* are described. The other is a note of eight lines, "A Bromeliadicolous Caddis-worm" (Ent. News 22: 411, 1911) referring to material received from Fritz Müller in Brazil.

The fifty papers by Morton dealing with Odonata are concerned chiefly with the Palaearctic and Ethiopian faunas, but include the descriptions of two remarkable new genera: *Chorismagrion* (1914) from North Queensland, resembling *Hemiphlebia,* also from Australia, in lacking the proximal side of the quadrilateral on the front wing, and *Coryphagrion* (1924) from Tanganyika Territory, East Africa, approaching *Mesopodagrion* of Thibet and western China and *Nesolestes* of Madagascar.—P. P. CALVERT.

OBITUARY

Edward Payson Van Duzee

Science for August 2, 1940, prints a brief notice of the life of this eminent author of the Catalogue of the Hemiptera of America north of Mexico (1897), who died June 2, 1940. He was born in New York City, April 6, 1861, and had been curator of the department of entomology of the California Academy of Sciences since 1916, and editor-in-chief of the *Pan-Pacific Entomologist* from 1924 to within a few months of his death. In *Science* for August 9, it is stated that the regular meeting of the California Academy on July 10, was devoted to a commemoration of his life and work, at which a number of well-known entomologists and other associates spoke.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being ongest in) are discontinued.

Desired—Dolichopodidae of western United States and Canada. Will determine for privilege of retaining duplicates. F. C. Harmston, Entomology Dept., Utah Agric. College, Logan, Utah.

Wanted.—Chrysididae and Cleptidae of the world for cash or for exchange and determination, especially Nearctic and Neotropical material, for revisional purposes. W. G. Bodenstein, Dept. of Entomology, Cornell University, Ithaca, N. Y.

Wanted.—Nitidulidae for determination or exchange. Correspondence desired with those who will collect. H. R. Dodge, 78 Anne Street, Clintonville, Wisconsin.

Wanted.—To hear from specialists who would care to determine some family of insects for a share of the duplicates. We have many specimens, especially in some families of Diptera and Hymenoptera. H. E. Jaques, Iowa Insect Survey, Mt. Pleasant, Iowa.

Insects from Northern Korea.—I will collect insects for specialists in certain groups upon their request; very rich fauna; rates reasonable. Address: Mr. Alexander M. Yankovsky, Shuotsu-Ompo, Korea, Japan.

Wanted—Living specimens of the luminous beetle **Phengodes** this summer. E. Newton Harvey, The Biology Dept., Princeton University, Princeton, New Jersey.

Malacodermata (except Lycidae and Cleridae) of the world. Will determine and purchase. Also exchange against Col. or all other insects from Bolivia. Walter Wittmer, Casilla 219, Oruro, Bolivia, S. America.

I want to collect Rothschildia, agapema, gulfina and io moths and Texas butterflies for interested persons. Eula Frizzell, R 4 San Benito, Texas.

Wanted—To hear from collectors who desire extra good cocoons of Michigan **Platysamia columbia,** that will emerge June, 1941. W. S. McAlpine, 575 Townsend St., Birmingham, Michigan.

Wanted—Specimens of the genus Trox from North America. Will exchange or determine for duplicate material. Mark Robinson, 231 Cherry St., Sharon Hill, Pennsylvania.

Lepidoptera—From the South, including P. palamedes, T. halesus and E. jucunda to exchange for fauna from other localities. H. W. Eustis, 2230 McDowell St., Augusta, Georgia.

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WORKING ENTOMOLOGISTS

We would call your attention to the increasing scarcity of many of the publications of The American Entomological Society, and advise you to obtain those desired before the publisher is unable to supply them, at least at the present prices. This refers to contributions published in the Proceedings of The Entomological Society of Philadelphia and in the Transactions of The American Entomological Society. We will be glad to give you prices on any available if you send us your desiderata, stating authors, volume and pagination. We also have a large number of entomological papers published in other journals, duplicated in the Society's library. In submitting your want list in this line, give order, author, journal, volume, pagination and date. Address:

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